

CLAIMS

1. A negative electrode material for non-aqueous electrolyte secondary batteries, which is capable of absorbing and desorbing lithium, characterized in that

said negative electrode material comprises a composite particle including solid phases A and B, said solid phase A being dispersed in said solid phase B,

said solid phase A comprises at least one element selected from the group consisting of silicon, tin and zinc,

said solid phase B comprises a solid solution or an intermetallic compound, which contains: the constituent element of said solid phase A; and at least one element selected from the group consisting of the elements of Group 2, transition, Group 12, Group 13 and Group 14 which are listed in Long Form of Periodic Table, except for the constituent element of said solid phase A and carbon, and

the ratio (I_A/I_B) of the maximum diffracted X-ray intensity (I_A) attributed to said solid phase A to the maximum diffracted X-ray intensity (I_B) attributed to said solid phase B satisfies $0.001 \leq I_A/I_B \leq 0.1$, in terms of a diffraction line obtained by a wide-angle X-ray diffraction measurement of said composite particle.

2. A negative electrode material for non-aqueous electrolyte secondary batteries, which is capable of absorbing and desorbing lithium, characterized in that

said negative electrode material comprises a composite particle including solid phases A and B, said solid phase A being dispersed in said solid phase B,

said solid phase A comprises at least one element selected from the group consisting of silicon, tin and zinc,

said solid phase B comprises a solid solution or an intermetallic compound, which contains: the constituent element of said solid phase A; and at least one element selected from the group consisting of the elements of Group 2, transition, Group 12, Group 13 and Group 14 which are listed in Long Form of Periodic Table, except for the constituent element of said solid phase A and carbon, and

the half width (W) (radian) of the maximum peak intensity of diffracted X-rays, attributed to said solid phase A, satisfies $0.001 \leq W \leq 0.1$, in terms of a diffraction line obtained by a wide-angle X-ray diffraction measurement of said composite particle.

3. The negative electrode material for non-aqueous electrolyte secondary batteries in accordance with Claim 1 or 2, wherein said solid phase A comprises Si and Sn, and said solid phase B comprises a solid solution or an intermetallic compound, which contains Cu and at least one of Sn and Si.

4. The negative electrode material for non-aqueous electrolyte secondary batteries in accordance with Claim 3, wherein said solid phase B comprises CuSi_2 and Cu_6Sn_5 .

5. The negative electrode material for non-aqueous

electrolyte secondary batteries in accordance with Claim 3, wherein said solid phase B comprises CuSi_2 and a solid solution containing Cu and Sn.

6. The negative electrode material for non-aqueous electrolyte secondary batteries in accordance with Claim 3, wherein said solid phase B comprises Cu_6Sn_5 and a solid solution containing Cu and Si.

7. The negative electrode material for non-aqueous electrolyte secondary batteries in accordance with Claim 3, wherein said solid phase B comprises a solid solution containing Cu and Si, and a solid solution containing Cu and Sn.

8. The negative electrode material for non-aqueous electrolyte secondary batteries in accordance with Claim 1 or 2, wherein said solid phase A comprises Si and said solid phase B comprises a solid solution or an intermetallic compound, which contains Ti and Si.

9. The negative electrode material for non-aqueous electrolyte secondary batteries in accordance with Claim 8, wherein said solid phase B comprises TiSi_2 having a crystal structure of at least one selected from the group consisting of Cmcn and Fddd.

10. A non-aqueous electrolyte secondary battery comprising a positive electrode capable of a reversible electrochemical reaction of lithium, a non-aqueous electrolyte comprising an organic solvent and a lithium salt dissolved in

said organic solvent, and a negative electrode comprising the negative electrode material in accordance with any of Claims 1 to 9.